Remarks

Amendment to the claims

Claims 1-6 have been amended. Among other amendments, limitations concerning a field emission electron gun have been added to claims 1-6, and the magnetic superposition lens limitation of these claims has been replaced with limitations directed to a magnetic superposition lens including a magnetic circuit and a magnetic field generating portion. All of claims 1-6 have been amended for clarity and claims 5 and 6 have additional limitations added, such as the "pin hole" limitation added to claim 5 and the "reflected electron detecting means," "electron image generating means," and "target selecting means" of claim 6.

Claims 7-10 have been cancelled without prejudice.

Claim 11 is added to claim a further aspect of the invention. Support for the new claim 11 may be found in the specification at paragraph [0056] (page 29-30 of the application as filed), concerning a CdTe (cadmium telluride) semiconductor.

Claims 1-6 and 11 are now present in this application. No new matter has been added.

Reconsideration of the application is respectfully in view of these amendments and the remarks that follow.

Objections to the claims

The Examiner objected to claims 1-6 and 8-10 because of several informalities. The suggestions of the Examiner have been adopted for amending claims 1-6 to overcome these objections, to the extent not mooted by other claim amendments. Claims 7-10 have been canceled without prejudice and therefore do not need to be amended.

Accordingly, Applicants respectfully request the Examiner to withdraw the objections to claims 1-6.

Rejection under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claim 6 under 35 U.S.C. 112, Second Paragraph, as being indefinite. The phrase "may be" has been deleted from this claim. Accordingly, Applicants respectfully request the Examiner to withdraw the indefiniteness rejection of claim 6.

Rejections under 35 U.S.C. § 103(a)

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 5,044,001 to Wang in view of U.S. patent publication 2003/0039386 to Ishitani et al. Claims 2, 5, 7, and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of U.S. patent 3,862,419 to Veneklasen. Claims 3 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Veneklasen and U.S. patent 6,555,816 to Sawahata et al. Claims 4 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Veneklasen and U.S. patent publication 2001/0001010 to Wilkins. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of U.S. patent 6,649,914 to Moorman et al.

Applicants respectfully disagree for the reasons given below.

As a preliminary matter, claims 7-10 have been canceled without prejudice. Only the rejections of claims 1-6 need be addressed.

A *prima facie* case of unpatentability is not made out for any of claims 1-6 at least because all of the limitations now present in claims 1-6 are not taught or suggested by

the cited references. M.P.E.P. 2143 ("To establish a *prima facie* case of obviousness, three basic criteria must be met. . . . Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.").

Claim 1

Applicants submit that Wang does not disclose, teach or suggest, *inter alia*, at least the following features recited by amended claim 1 of the present application:

> "...wherein said electron source of said electron generating portion is disposed substantially in the center of said focusing lens magnetic field and said focusing lens magnetic field **is superposed to** said electric field thereby reducing a lens aberration of said magnetic superposition lens and reducing a loss amount of said electrons from said electron source **by focusing said electrons being accelerated** by said electric field, ..." (emphasis added).

The Examiner asserts that the "magnetic superposition lens" as recited in claim 1 is disclosed by Wang (Fig.2, reference no. 6). *See* page 3, lines 25-26 of the Official Action. Applicants respectfully traverse the Examiner's assertion.

According to Wang, the electromagnetic lens (Fig. 2, reference no. 6) is located at the downstream side of the anode (Fig. 2, reference no. 4). Therefore, the accelerating electric field is generated in the space between the electron gun (the electron source, Fig. 2, reference no. 3) and the anode, and there is no accelerating electric field at the focusing lens magnetic field generated by the electromagnetic lens. Because the accelerating electric field is separated from the focusing lens magnetic field, Wang does

not disclose, teach or suggest that the "focusing lens magnetic field **is superposed to** said electric field " and "reducing a loss amount of said electrons from said electron source **by focusing said electrons being accelerated** by said electric field " (emphasis added) as stated in amended claim 1.

Claims 2-6 also have been amended to include the quoted limitations.

Ishitani, et al. do not disclose these limitations.

Hence claim 1 is patentable over Wang in view of Ishitani, et al. and should be allowed by the Examiner. Amended claims 2-6 and new claim 11 are also believed to be patentable over Wang as discussed further below.

Claims 2 and 5

Applicants submit that Wang does not disclose, teach or suggest, *inter alia,* at least the limitations of claims 2 and 5 noted above in connection with claim 1.

Applicants submit that Veneklasen does not disclose, teach or suggest, *inter alia,* at least the following limitations recited by amended claim 2 of the present application.

> "...said field emission electron gun further comprising a magnetic superposition lens including a magnetic circuit and a magnetic field generating portion, wherein said magnetic field generating portion is disposed separately from said ultra-high vacuum electron gun chamber and said magnetic superposition lens is adapted to generate a focusing lens magnetic field having a center,
>
> wherein said magnetic field generating portion is disposed outside of said ultra-high vacuum electron gun chamber,

wherein **said electron source of said electron generating portion is disposed substantially in the center of said focusing lens magnetic field** and said focusing lens magnetic field is superposed to said electric field thereby **reducing a lens aberration of said magnetic superposition lens and reducing a loss amount of said electrons** from said electron source by focusing said electrons being accelerated by said electric field, ..." (emphasis added)

The Examiner asserts that the "magnetic superposition lens" as recited in Claim 2 is disclosed by Veneklasen (see Fig. 2). *See* page 5-6 of the Official Action. Applicants respectfully disagree.

The purpose of the system of Veneklasen is to retain the position of the first image 9 of an electron source (column 4, lines 14-15). Veneklasen discloses an excitation of magnetic auxiliary lens 15, 16 for that purpose. But Veneklasen does not describe a positional and functional relation between a magnetic field and an accelerating electric field. Referring to Fig. 2 of Veneklasen, the field-emission cathode 1 is located above the magnetic lens 15, 16 and the cathode is a part above the center of the focusing magnetic field of the magnetic lens. Therefore, the accelerating electric field is not in the part where the superposition of the focusing lens magnetic field operates strongly.

On the other hand, as shown in FIG. 4 and FIG. 5 of the present specification, the electron source is located near the center of the focusing lens magnetic field. And as recited in the present specification at paragraphs [0031], [0034], and [0036] to [0039] (page 13, 15, 17-20 of the present application as filed), the electrons released from the electron source are accelerated by the accelerating electric field and are focused by the focusing lens magnetic field at the same time. As a result, it causes the lens aberration,

especially spherical aberration, to become smaller than that of the lens of Veneklasen, and this brings a more effective performance to an X-ray apparatus wherein a microscopic beam of electrons with high intensity is required.

Therefore the purpose of invention of Veneklasen is different from this invention, which argues against the proposed combination of references because of the lack of a suggestion or motivation to combine Wang and Veneklasen. Furthermore, Veneklasen does not specifically teach, disclose or suggest the limitation "**said electron source of said electron generating portion is disposed substantially in the center of said focusing lens magnetic field**," whereby the effect of "**reducing a lens aberration of said magnetic superposition lens and reducing a loss amount of said electron**" (emphasis added) is produced as recited in amended claim 2.

Hence amended claim 2 is patentable over Wang in view of Veneklasen, and should be allowed by the Examiner. Claims 3-5 and new claim 11 are also believed to be patentable over Wang in view of Veneklasen for at least these reasons.

Claim 3

Applicants submit that Wang does not disclose, teach or suggest, *inter alia*, at least the limitation recited by amended claim 3 of the present application as noted above in connection with claim 1.

Applicants also submit that Veneklasen does not disclose, teach or suggest, *inter alia*, at least the limitations of amended claim 3 of the present application as noted in connection with claim 2.

Applicants further submit that Sawahata, et al. do not disclose, teach or suggest, *inter alia*, at least the following features recited by amended claim 3 of the present application:

"...an electron beam axis **alignment coil disposed in an upstream side of said anode and disposed close to said electron source**, for aligning an axis of said electron beam allowed to impinge on said target for X-ray generation via said magnetic superposition lens while accelerating the electron beam." (emphasis added)

Sawahata, et al. do not describe the placement of an alignment coil. Referring to Fig. 1 of Sawahata, et al., the alignment coil 22 is located at a downstream side of the anode (Fig. 1, reference numerals 3 and 4).

On the other hand, a preferred embodiment of the present invention discloses an alignment coil 1e disposed in an upstream side of the anode 1c as shown in FIG. 3 ,FIG. 5 and FIG. 6 of the present specification, and an alignment coil 1e is disposed close to the electron source as described in the present specification at paragraph [0050] (page 26 of the present application as filed). Therefore, at that portion where the accelerating electric field generated by the anode and the deflecting magnetic field generated by the alignment coil are superposed, the electrons released from the electron source 1b are accelerated and deflected at the same time.

Therefore, Sawahata, et al. does not specifically teach, disclose or suggest the "**electron beam axis alignment coil disposed in an upstream side of said anode and disposed close to said electron source**" (emphasis added) as recited in amended claim 3.

Hence claim 3 is patentable over Wang in view of Veneklasen and Sawahata, et al., and should be allowed by the Examiner.

Claim 4

Applicants submit that Wang does not disclose, teach or suggest, *inter alia* ,at least the limitations recited by amended claim 4 of the present application as discussed above in connection with claim 1.

Applicants also submit that Veneklasen does not disclose, teach or suggest, *inter alia,* at least the limitations recited by amended claim 4 of the present application as noted above in connection with claim 2.

Applicants further submit that Wilkins does not disclose, teach or suggest, *inter alia,* at least the following features recited by amended claim 4 of the present application:

> "...**electron probe control means for controlling circular scanning of the electron beam** on said target by deflecting the focused electron beam..."(emphasis added)

Concerning CT, Wilkins describes only "to implement limited field computerized tomography (CT) either by scanning the exciting beam on the target or by rotating the entire cell," at paragraph [0113]. Therefore Wilkins does not specifically teach, disclose or suggest "...**electron probe control means for controlling circular scanning of the electron beam** on said target by deflecting the focused electron beam..." (emphasis added) as recited in amended claim 4 and supported by paragraph [0051] of the specification (page 27 of the present application as filed)

Hence claim 4 is patentable over Wang in view of Veneklasen and Wilkins , and should be allowed by the Examiner.

Claim 5

Applicants submit that Wang does not disclose, teach or suggest, *inter alia* ,at least the limitations recited by amended claim 5 of the present application as noted above in connection with claim 1.

Applicants also submit that Veneklasen does not disclose, teach or suggest, *inter alia,* at least the limitations of amended claim 5 of the present application as noted above in connection with claim 2.

Applicants further submit that Wang further does not disclose, teach or suggest, *inter alia,* at least the following limitations recited by amended claim 5 of the present application:

A:

"...fluorescent X-ray detecting means having a detecting portion disposed in a space between said target and an objective lens and disposed above said object and outside a region of a generation of said X-ray for detecting a fluorescent X-ray generated from said object, wherein **said objective lens has a long focal distance and a longer working distance of several centimeters**..." (emphasis added)

B:

"...a pin hole, wherein said **pin hole is located between said target** and said object and said **pin hole is scanned** in order to specify a region and

positional identification of said object to do an elemental analysis and to take a perspective image corresponding to said object by said X-ray passing through said pin hole." (emphasis added)

for limitations A:

Wang refers to some dispositions of an X-ray detector 18 in his specification (at column 9, lines 18-33), but does not show how to dispose the detector concretely except to dispose the detector below the specimen 14 as shown in FIG. 1, and does not describe any effects.

On the other hand, it is disclosed in the present application that in order to dispose the X-ray analytical detector 13 above the object, an objective lens having a long focal distance is adopted and it thereby enables one to make a space to locate the detector between the object 10 and target, as described in the present specification at [0055] (page 29 of the present application as filed).

Therefore Wang dose not disclose "...fluorescent X-ray detecting means having a detecting portion disposed in a space between said target and an objective lens and disposed above said object and outside a region of a generation of said X-ray for detecting a fluorescent X-ray generated from said object, wherein **said objective lens has a long focal distance and a longer working distance of several centimeters**..." (emphasis added) as recited in amended claim 5.

for limitations B:

Wang does not disclose a pin hole scanning means in order to specify the region and positional identification of the analyzed object in a fluorescent analysis.

Therefore Wang does not specifically teach, disclose or suggest "...a pin hole, wherein said **pin hole is located between said target** and said object and said **pin hole is scanned** in order to specify a region and positional identification of said object to do an elemental analysis and to take a perspective image corresponding to said object by said X-rays passing through said pin hole" (emphasis added) as recited in amended claim 5.

Hence claim 5 is patentable over Wang in view of Veneklasen, and should be allowed by the Examiner.

Claim 6

Applicants submit that Wang does not disclose, teach or suggest, *inter alia,* at least the limitations recited by amended claim 6 of the present application as noted above in connection with claim 1.

Applicants also submit that Moorman, et al. do not disclose, teach or suggest, *inter alia,* at least the following features recited by amended claim 6 of the present application:

> "wherein said target selecting means has a function of selecting a target element within a plurality of target elements **by a user's selecting operation according to said electron image of said target surface**" (emphasis added)

Moorman, et al. do not disclose "the respective targets 3 (3a, 3b, and 3c in this example) can be selected according to the observation purpose while watching the

reflected electron image" that is disclosed in the present specification at paragraph [0058] (page 30 of the present application as filed).

Therefore Moorman, et al. do not specifically teach, disclose or suggest the following limitation of claim 6: "wherein said target selecting means has a function for selecting a target element within a plurality of target elements **by a user's selecting operation according to said electron image of said target surface**." (emphasis added)

Hence Claim 6 is patentable over Wang in view of Moorman, et al. and should be allowed by the Examiner.

Claims 7 – 10

Claims 7-10 have been canceled without prejudice.

New Claim 11

New claim 11 depends on claim 5. Applicants submit that at least in view of its dependency from claim 5, and the discussion above, new claim 11 is patentable over the cited references.

* * *

In view of the above, Applicants submit that the application is now in condition for allowance and respectfully urge the Examiner to pass this case to issue.

The Commissioner is authorized to charge any additional fees that may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

I hereby certify that this correspondence is being deposited with the United States Post Office with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

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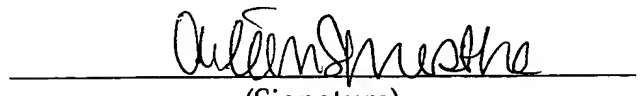
(Name of Person Transmitting)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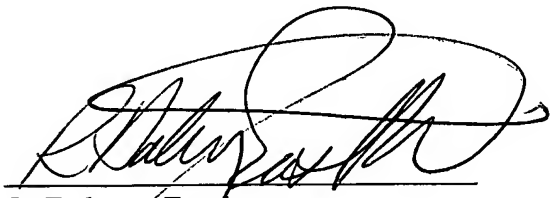
Respectfully submitted,



R. Dabney Eastham
Attorney for the Applicant
Reg. No. 31,247
LADAS & PARRY
5670 Wilshire Boulevard,
Suite 2100
Los Angeles, California 90036
(323) 934-2300 voice
(323) 934-0202 facsimile